Installation Manual
P/N MMI-20016185, Rev. AA
January 2010

Micro Motion® 9739 MVD Transmitters

Installation Manual

1 Planning

2 Mounting

3 Wiring

Micro Motion®

EMERSON™
Process Management

Safety and approval information

This Micro Motion product complies with all applicable European directives when properly installed in accordance with the instructions in this manual. Refer to the EC declaration of conformity for directives that apply to this product. The EC declaration of conformity, with all applicable European directives, and the complete ATEX Installation Drawings and Instructions are available on the internet at www.micromotion.com/atex or through your local Micro Motion support center.

For intrinsically safe installations, use this manual with the appropriate UL-D-IS and CSA-D-IS Installation Instructions available on the internet at www.micromotion.com/documentation or through your local Micro Motion support center.

Information affixed to equipment that complies with the Pressure Equipment Directive can be found on the internet at www.micromotion.com/documentation.

For hazardous installations in Europe, refer to standard EN 60079-14 if national standards do not apply.

Other information

Full product specifications can be found in the product data sheet. Troubleshooting information can be found in the transmitter configuration manual. Product data sheets and manuals are available from the Micro Motion web site at www.micromotion.com/documentation.

Return policy

Micro Motion procedures must be followed when returning equipment. These procedures ensure legal compliance with government transportation agencies and help provide a safe working environment for Micro Motion employees. Failure to follow Micro Motion procedures will result in your equipment being refused delivery.

Information on return procedures and forms is available on our web support system at www.micromotion.com, or by phoning the Micro Motion Customer Service department.

Micro Motion customer service

Location		Telephone number
U.S.A.		800-522-MASS (800-522-6277) (toll free)
Canada and Latin America		+1 303-527-5200 (U.S.A.)
Asia	Japan	3 5769-6803
	All other locations	+65 6777-8211 (Singapore)
Europe	U.K.	0870 240 1978 (toll-free)
	All other locations	+31 (0) 318 495 555 (The Netherlands)

Customers outside the U.S.A. can also send an email to flow.support@emerson.com.

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Contents

Chapter 1

Planning

Topics covered in this chapter:

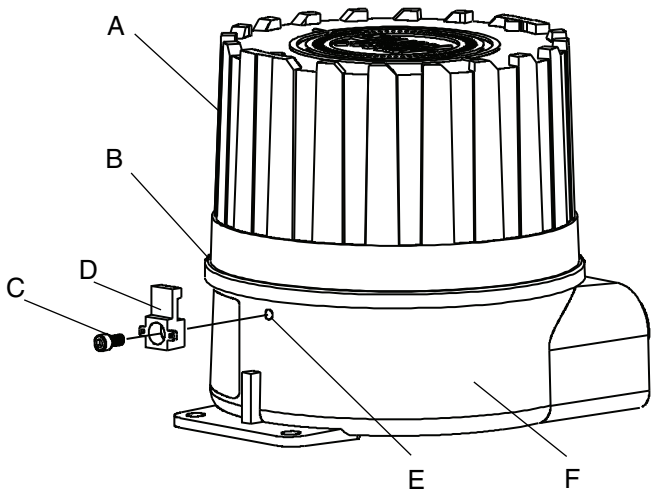
Installation checklist

- ❑ Make sure that the transmitter is suitable for the environment in which it will be installed. See the hazardous area specified on the transmitter approval tag.
- ❑ Locate and mount the transmitter according to the following requirements:
  - The transmitter must be accessible for service and calibration.
  - The ambient temperature of the location must remain between –31 and +131 °F (–35 and +55 °C). If the transmitter has a display, the display may become difficult to read below 14 °F (–10 °C).
  - The mounting location must allow the following clearance for removal of the housing cover:
    - 11.50 inches (292 mm) for units without displays
    - 10.46 inches (266 mm) for units with displays
  - To prevent condensation or other moisture from entering the housing, orient the transmitter with its conduit openings pointed downward. Be sure to seal the three 3/4-inch NPT female conduit openings to keep the transmitter watertight.
- ❑ Verify that you have the appropriate 9-wire cable and required cable installation parts for your installation. Use Micro Motion 9-wire cable to wire the 9739 MVD transmitter and sensor. For wiring between the transmitter and sensor, verify the maximum cable length does not exceed 1000 ft (300 m).
- ❑ Ensure that you use twisted-pair, shielded cable for all I/O connections.
- ❑ For ATEX installations, you must strictly adhere to the safety instructions documented throughout this manual and to the ATEX approvals documentation available on the internet at www.micromotion.com.
- ❑ For ATEX installations, each transmitter is shipped with a standard lockout clamp secured to the housing. The lockout clamp prevents access to the transmitter wiring terminals and electronics module. When removing or attaching the transmitter housing cover, you must remove and reattach the transmitter housing lockout clamp (see Figure 1-1).

Important

For custody transfer applications in the United States and Europe, you must install a transmitter lockout clamp designed specifically for the custody transfer application. Contact Micro Motion for more information on receiving the appropriate parts for your application.

Figure 1-1 Standard housing lockout clamp components (ATEX installations only)



A Housing cover
B Lip
C Mounting screw
D Clamp
E Threaded hole
F Housing base

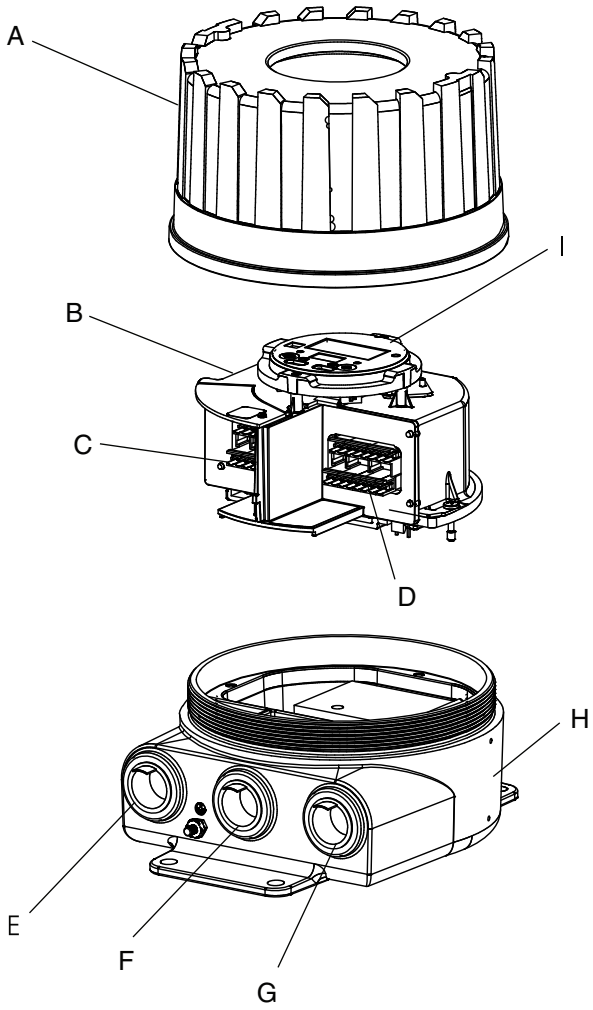
Notes

- Before installing the transmitter housing lockout clamp, make sure that you have properly installed the transmitter and the flowmeter has been zeroed.

9739 MVD transmitter components

Figure 1-2 shows the 9739 MVD transmitter components.

Figure 1-2 Components of the 9739 MVD transmitter



A Removable housing cover
B Electronics module
C Intrinsically safe sensor wiring terminals
D Non–intrinsically-safe output wiring terminals
E Conduit opening for sensor wiring
F Conduit opening for power supply wiring
G Conduit opening for output wiring
H Housing base
I User interface: with or without display options

Chapter 2

Mounting

Topics covered in this chapter:

- Mount the 9739 MVD transmitter to a wall
- Mount the 9739 MVD transmitter to an instrument pole
- Rotate the user interface on the electronics module (optional)

Mount the 9739 MVD transmitter to a wall

Prerequisites

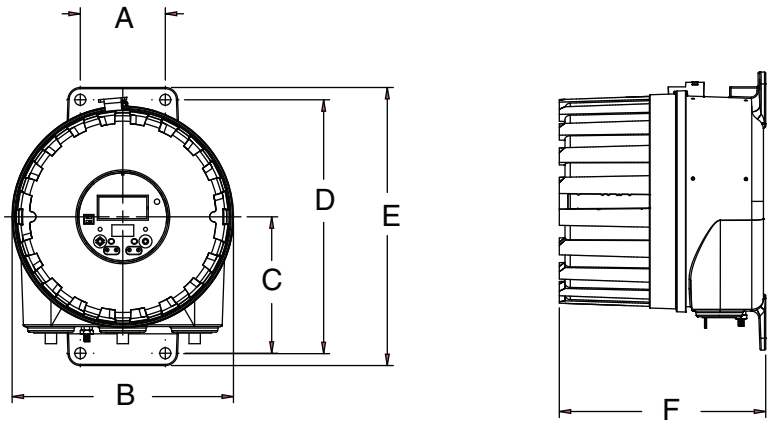
- Use four 5/16-inch diameter (or M8) bolts and nuts that can withstand the process environment. Micro Motion does not supply bolts or nuts (appropriate bolts and nuts are available as an option).
- Ensure that the surface is flat and rigid, does not vibrate, or move excessively.

Procedure

Mount the transmitter, using Figures 2-1 and 2-2 as guides.

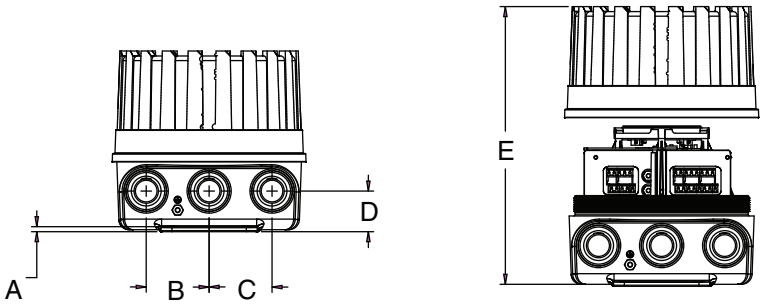
To minimize stress on the housing, secure all four mounting bolts to the same structure. Do not secure bolts to separate girders, beams, or wall studs, which can move independently.

Figure 2-1 Transmitter mounting dimensions (front and side views)



A 2.81 inches (71 mm)
B 7.31 inches (186 mm)
C 4.51 inches (115 mm)
D 8.39 inches (213 mm)
E 9.19 inches (233 mm)
F **With display:** 6.82 inches (173 mm); **Without display:** 7.28 inches (185 mm)

Figure 2-2 Transmitter mounting dimensions (bottom view)



A 0.19 inches (5 mm)
B 2.38 inches (60 mm)
C 2.38 inches (60 mm)
D 1.53 inches (39 mm)
E **With display:** 10.46 inches (266 mm); **Without display:** 11.50 inches (292 mm)

Mount the 9739 MVD transmitter to an instrument pole

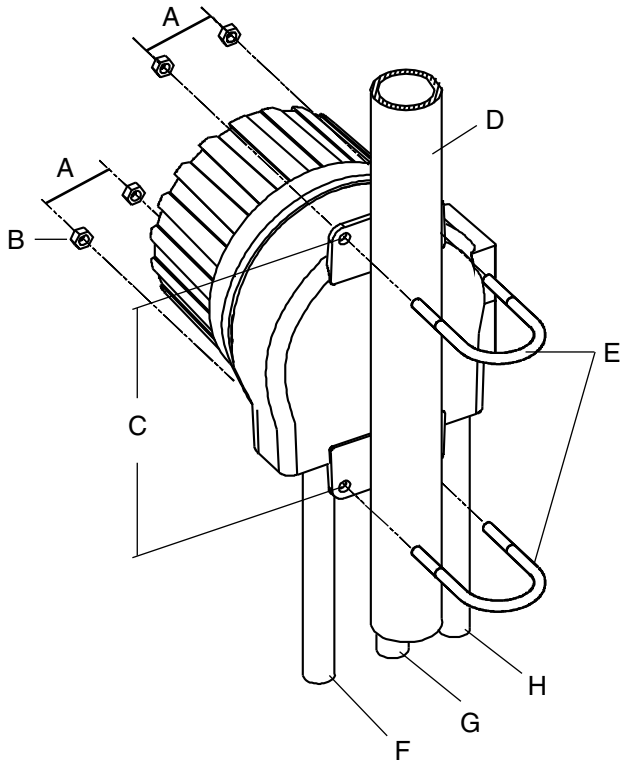
Prerequisites

- Use two 5/16-inch U-bolts for 2-inch pipe, and four matching nuts, that can withstand the process environment. Micro Motion does not supply U-bolts or nuts.
- Ensure the instrument pole extends at least 12 inches (305 mm) from a rigid base, and is no more than 2 inches (50.8 mm) in diameter.

Procedure

Mount the transmitter to an instrument pole, using Figure 2-3 as a guide.

Figure 2-3 Mounting the 9739 MVD Transmitter to an instrument pole



A 2 13/16 inches (71 mm) between mounting holes
B Four 5/16 inches (8 mm) nuts are required to secure 5/16-inch U-bolts
C 8 3/8 inches (213 mm)
D 2-inch pipe
E Two 5/16-inch 18 U-bolts required
F Output wiring conduit
G Power supply wiring conduit
H Sensor cable wiring conduit

Rotate the user interface on the electronics module (optional)

The user interface on the transmitter electronics module can be rotated 180° from the original position.

Procedure

1. Shut off power to the unit.
2. Unscrew and remove the transmitter housing cover.

   If the transmitter is installed in a hazardous area, be sure you have shut off power to the transmitter before removing the housing cover. Removing the transmitter housing cover in a hazardous area while the transmitter is powered up can cause an explosion.
3. Remove the user interface:

   a. Loosen the two user interface screws.

   b. Gently lift the user interface, disengaging it from the connectors on the electronics module.
4. Rotate the user interface to the desired position and plug it into the user interface connectors on the electronics module.
5. Tighten the user interface screws.
6. Replace and tighten the transmitter housing cover.
7. Restore power to the transmitter.

Chapter 3

Wiring the power supply and grounding the transmitter

Topics covered in this chapter:

- Power supply requirements
- Wire the power supply
- Ground the 9739 MVD transmitter

Power supply requirements

The 9739 MVD transmitter can accept either AC or DC power. The transmitter automatically recognizes the source voltage.

Table 3-1 lists the AC and DC power requirements for the 9739 MVD transmitter.

Table 3-1 Power supply requirements

AC power requirements	• 85 to 265 VAC • 50/60 Hz • 4 W typical, 7 W maximum
DC power requirements	• 12 to 30 VDC • 4 W typical, 7 W maximum

Wire the power supply

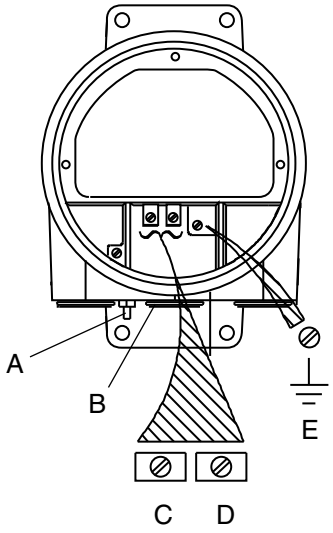
The power supply wiring terminals are located in the base of the transmitter housing. You must remove the electronics module to access the terminals and the power ground terminal(s).

Procedure

1. Remove the transmitter housing cover.
2. Remove the three housing screws attaching the electronics module to the base of the transmitter housing.
3. Disconnect the electronics module power connector from the base of the module.
4. Remove the electronics module from the transmitter housing base.

   Figure 3-1 shows the location of the power supply wiring terminals and power ground terminal.

Figure 3-1 Power supply wiring terminals



A External ground terminal
B Power supply conduit opening
C **L / L1** for AC; **+** for DC
D **N / L2** for AC; **–** for DC
E Power ground terminal

5. Secure the input power connections at the two labeled terminals.

   For AC-powered transmitters, you may install a switch in the power supply line. For compliance with Low Voltage Directive 2006-95-EC, a switch in close proximity to the transmitter is required for AC-powered transmitters.

6. Ground the power supply according to the standards that are applicable at your site.

Important
Use the external ground terminal as an additional ground connection for ungrounded power supplies.

Ground the 9739 MVD transmitter

The 9739 MVD transmitter must be grounded according to the standards that are applicable at the plant. You are responsible for knowing and complying with all applicable standards.

Prerequisites

You must properly ground the 9739 MVD transmitter according to the instructions provided. Improper grounding could cause inaccurate measurements or flow meter failure. Failure to comply with requirements for intrinsic safety in a hazardous area could result in an explosion. For hazardous area installations in Europe, refer to standard EN 60079-14 if national standards do not apply.

Important
Follow the plant standards if a separate high-integrity intrinsically safe ground scheme is used.

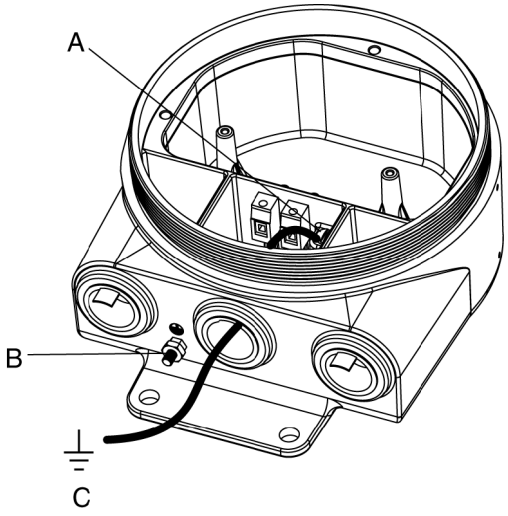
If national standards or plant standards are not in effect, adhere to the following guidelines for grounding:

- Use copper wire, 14 AWG (2.5 mm^2) or larger wire size.
- Keep all ground leads as short as possible, less than 1 Ω impedance.
- You can use the internal power ground terminal or the external ground terminal to ground the transmitter. Directly connect the ground lead from the terminal to Earth ground.
- To achieve potential equalization and comply with ATEX standards for hazardous area installations, connect the external ground terminal to the appropriate ground terminals within the hazardous area, using a potential-equalizing line.

Procedure

Refer to Figure 3-2 for information on grounding the transmitter.

Figure 3-2 Grounding the 9739 MVD transmitter



A Power ground terminal
B External ground terminal
C Earth ground

Chapter 4

Wiring the 9739 MVD transmitter to the sensor

Topics covered in this chapter:

Prepare the 9-wire cable

The type of cable you are using to install the 9739 MVD transmitter determines how you prepare the 9-wire cable. Micro Motion supplies three types of 9-wire cable: jacketed, shielded, and armored.

Procedure

To prepare the 9-wire cable for wiring to the transmitter and sensor, refer to the following information:

- See Figure 4-1 to prepare jacketed cable for installation in conduit.
- See Figure 4-2 to prepare shielded and armored cable for installation with cable glands.

Figure 4-1 Preparing jacketed cable

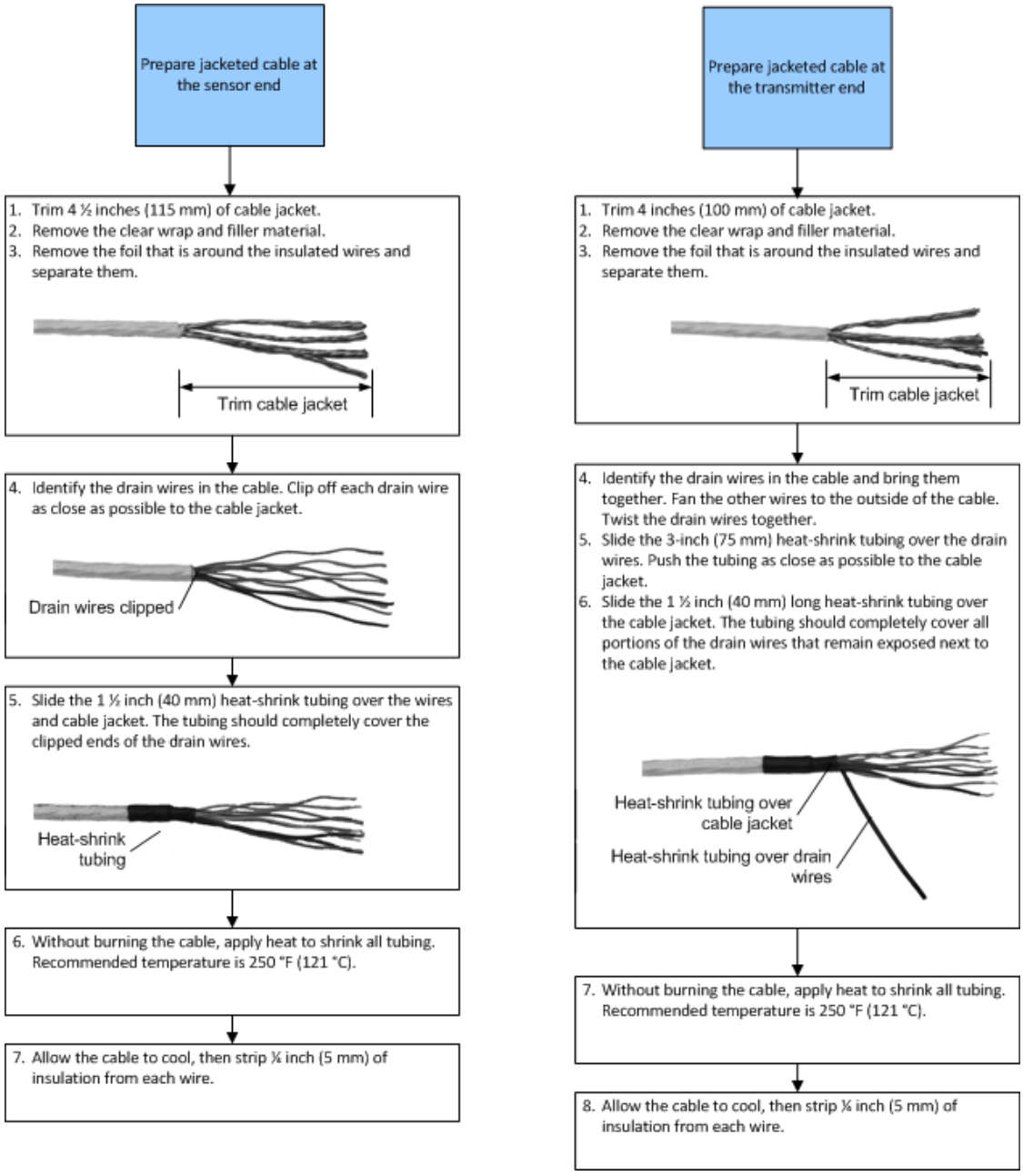
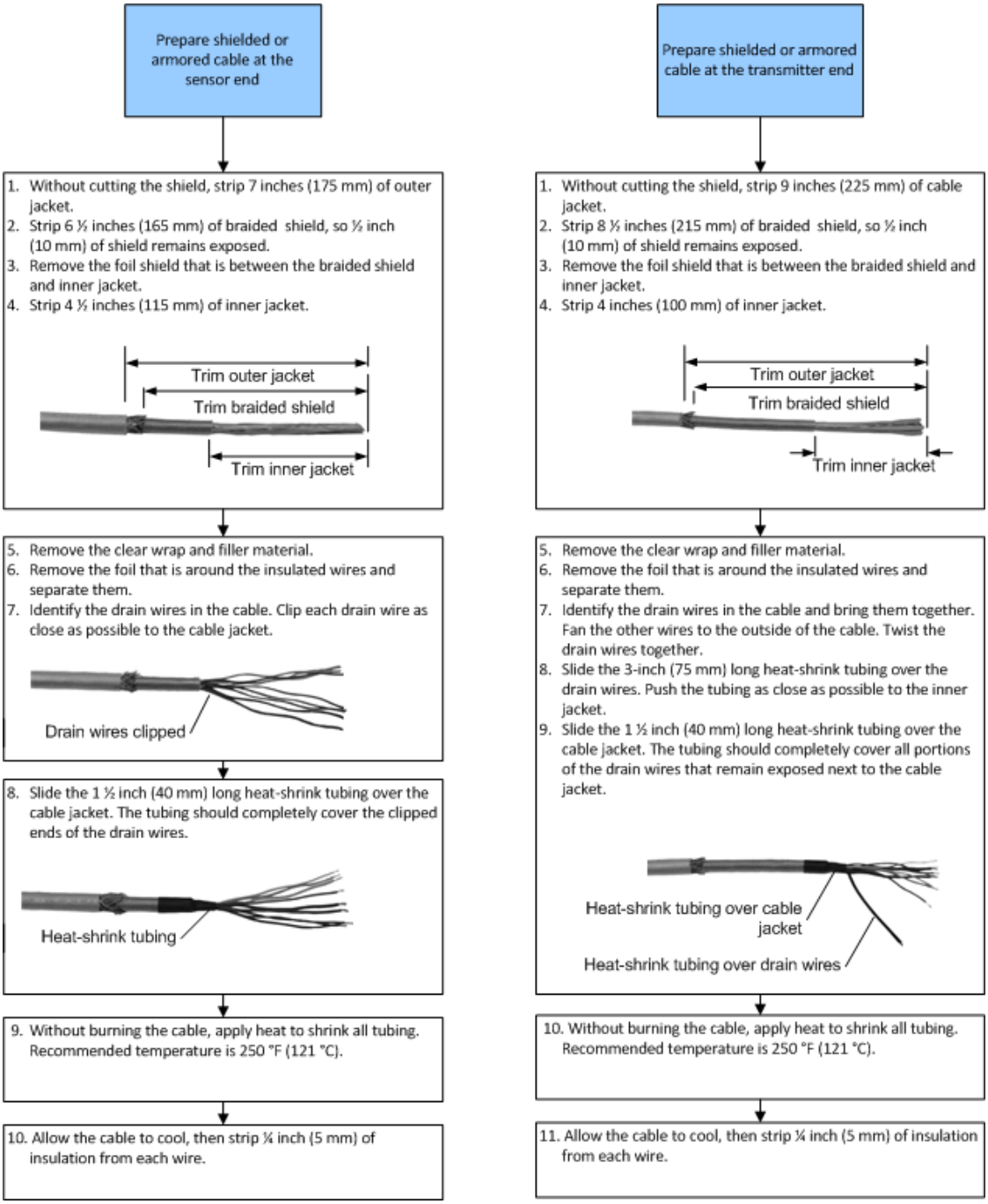


Figure 4-2 Preparing shielded or armored cable



Wire the transmitter to the sensor using jacketed cable

Prerequisites

For ATEX installations, the jacketed cable must be installed inside a user-supplied sealed metallic conduit that provides 360° termination shielding for the enclosed cable.

Sensor wiring is intrinsically safe. To keep sensor wiring intrinsically safe, keep the sensor wiring separated from power supply wiring and output wiring.

Keep cable away from devices such as transformers, motors, and power lines, which produce large magnetic fields. Improper installation of cable, cable gland, or conduit could cause inaccurate measurements or flow meter failure.

Install cable glands in the 9–wire conduit opening in the transmitter housing and the sensor junction box. Ensure that the cable drain wires and shields do not make contact with the junction box or the transmitter housing. Improper installation of cable or cable glands could cause inaccurate measurements or flow meter failure.

Improperly sealed housings can expose electronics to moisture, which can cause measurement error or flowmeter failure. Install drip legs in conduit and cable, if necessary. Inspect and grease all gaskets and O-rings. Fully close and tighten all housing covers and conduit openings.

Procedure

1. Install drip legs in conduit, if necessary.
2. Run the cable through the conduit. Do not install 9-wire cable and power cable in the same conduit.
3. To prevent conduit connectors from seizing in the threads of the conduit openings, apply a conductive anti-galling compound to the threads, or wrap threads with PTFE tape two to three layers deep.

   Wrap the tape in the opposite direction that the male threads will turn when inserted into the female conduit opening.
4. At both the sensor and transmitter, do the following:

   a. Remove the junction-box and transmitter housing covers.

   b. Connect a male conduit connector and waterproof seal to the conduit opening for 9-wire.

   c. Pass the cable through the conduit opening for the 9-wire cable.

   d. Insert the stripped end of each wire into the corresponding terminal at the sensor and transmitter ends, matching by color (see Table 4-2). No bare wire should remain exposed.

Note

For ELITE®, H-Series, T-Series, and some F-Series sensors, match the wire to the terminal by the color identified on the inside of the sensor junction box cover. See *Sensor and transmitter terminals* for illustrations identifying the various sensor and 9739 MVD transmitter terminals.

Table 4-2 Sensor and transmitter terminal designations

Wire color	Sensor terminal	Transmitter terminal	Function
Black	No connection	0	Drain wires
Brown	1	1	Drive +
Red	2	2	Drive –
Orange	3	3	Temperature –
Yellow	4	4	Temperature return
Green	5	5	Left pickoff +
Blue	6	6	Right pickoff +
Violet	7	7	Temperature +
Gray	8	8	Right pickoff –
White	9	9	Left pickoff –

e. Tighten the screws to hold the wire in place.

f. Ensure integrity of gaskets, grease all O-rings, then replace the junction-box and transmitter housing covers and tighten all screws, as required.

Wire the transmitter to the sensor using shielded or armored cable

Prerequisites

For ATEX installations, shielded or armored cable must be installed with cable glands, at both the sensor and transmitter ends. Cable glands that meet ATEX requirements can be purchased from Micro Motion. Cable glands from other vendors can be used.

Keep cable away from devices such as transformers, motors, and power lines, which produce large magnetic fields. Improper installation of cable, cable gland, or conduit could cause inaccurate measurements or flow meter failure.

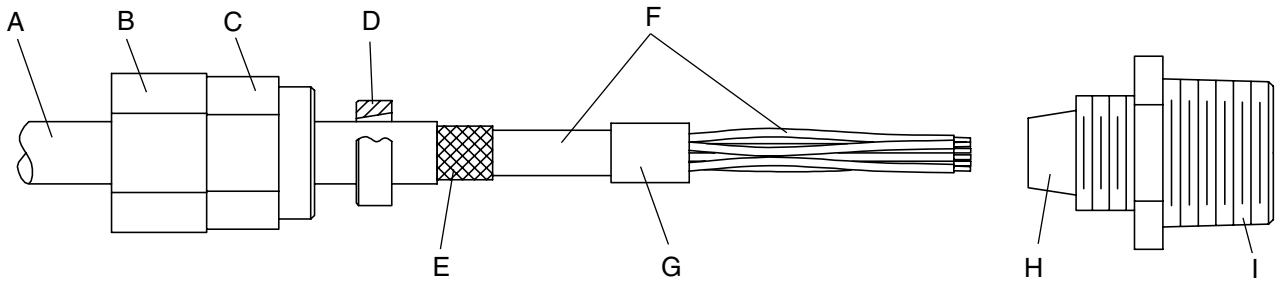
Install cable glands in the 9–wire conduit opening in the transmitter housing and the sensor junction box. Ensure that the cable drain wires and shields do not make contact with the junction box or the transmitter housing. Improper installation of cable or cable glands could cause inaccurate measurements or flow meter failure.

Improperly sealed housings can expose electronics to moisture, which can cause measurement error or flowmeter failure. Install drip legs in conduit and cable, if necessary. Inspect and grease all gaskets and O-rings. Fully close and tighten all housing covers and conduit openings.

Procedure

1. Install drip legs in conduit, if necessary.
2. Identify the components of the cable gland and cable shown in Figure 4-3.

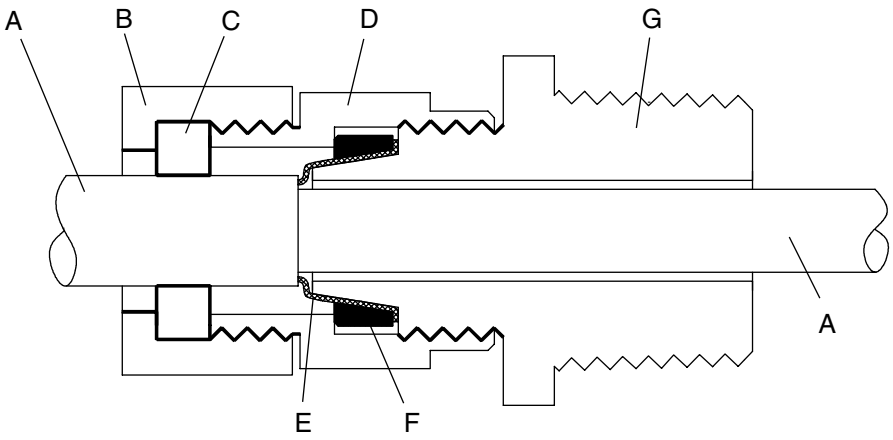
Figure 4-3 Cable gland and cable (exploded view)



A Cable
B Sealing nut
C Compression nut
D Brass compression ring
E Braided shield
F Cable
G Tape or heat-shrink tubing
H Clamp seat (shown as integral to nipple)
I Nipple

3. Unscrew the nipple from the compression nut.
4. Screw the nipple into the conduit opening for the 9-wire cable. Tighten it to one turn past hand-tight.
5. Slide the compression ring, compression nut, and sealing nut onto the cable. Make sure the compression ring is oriented so the taper will mate properly with the tapered end of the nipple.
6. Pass the cable end through the nipple so the braided shield slides over the tapered end of the nipple.
7. Slide the compression ring over the braided shield.
8. Screw the compression nut onto the nipple. Tighten the sealing nut and compression nut by hand to ensure that the compression ring traps the braided shield.
9. Use a 25-mm (1-inch) wrench to tighten the sealing nut and compression nut to 20–25 foot-pounds (27–34 N-m) of torque. See Figure 4-4 for an illustration of a complete cable gland assembly.

Figure 4-4 Cross-section of assembled cable gland with cable



A Cable
B Sealing nut
C Seal
D Compression nut
E Braided shield
F Brass compression ring
G Nipple

10. Remove the junction-box cover or transmitter housing cover.
11. At both the sensor and transmitter, connect the cable according to the following procedure:
    a. Insert the stripped end of each wire into the corresponding terminal at the sensor and transmitter ends, matching by color (see Table 4-3). No bare wires should remain exposed.

Note
For ELITE®, H-Series, T-Series, and some F-Series sensors, match the wire to the terminal by the color identified on the inside of the sensor junction box cover. See *Sensor and transmitter terminals* for illustrations identifying the various sensor and 9739 MVD transmitter terminals.

Table 4-3 Sensor and transmitter terminal designations

Wire color	Sensor terminal	Transmitter terminal	Function
Black	No connection	0	Drain wires
Brown	1	1	Drive +
Red	2	2	Drive –
Orange	3	3	Temperature –
Yellow	4	4	Temperature return
Green	5	5	Left pickoff +
Blue	6	6	Right pickoff +

Table 4-3 Sensor and transmitter terminal designations *continued*

Wire color	Sensor terminal	Transmitter terminal	Function
Violet	7	7	Temperature +
Gray	8	8	Right pickoff –
White	9	9	Left pickoff –

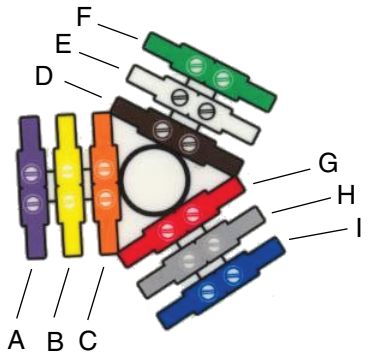
b. Tighten the screws to hold the wires in place.

c. Ensure integrity of gaskets, grease all O-rings, then replace the junction-box and transmitter housing covers and tighten all screws, as required.

Sensor and transmitter terminals

Figures 4-5 through 4-7 identify the terminals of the sensors that you can connect to the 9739 MVD transmitter, and Figure 4-8 identifies the 9739 MVD transmitter terminals.

Figure 4-5 ELITE, H-Series, T-Series, and some F-Series sensor terminals



A Violet
B Yellow
C Orange
D Brown
E White
F Green
G Red
H Gray
I Blue

Figure 4-6 F-Series, Model D, and Model DL sensor terminals

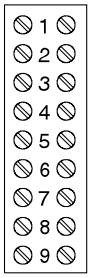
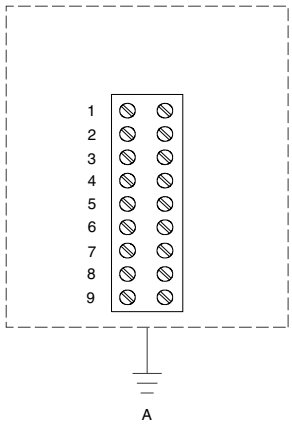
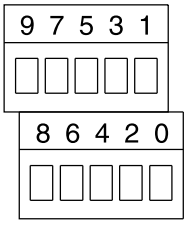


Figure 4-7 Model DT sensor terminals (user-supplied metal junction box with terminal block)



A Earth ground

Figure 4-8 9739 MVD transmitter terminals



Micro Motion 9-wire cable types and usage

Cable types

Micro Motion supplies three types of 9-wire cable: jacketed, shielded, and armored. Note the following differences between the cable types:

- Armored cable provides mechanical protection for the cable wires.
- Jacketed cable has a smaller bend radius than shielded or armored cable.
- If ATEX compliance is required, the different cable types have different installation requirements.

Cable jacket types

All cable types can be ordered with a PVC jacket or Teflon® FEP jacket. Teflon FEP is required for the following installation types:

- All installations that include a T-series sensor.
- All installations with a cable length of 250 ft (75 m) or greater, a nominal flow less than 20 percent, and ambient temperature changes greater than +68 °F (+20 °C).

Table 4-4 shows the temperature ranges of the cable jacket materials.

Table 4-4 Cable jacket material and temperature ranges

	Handling temperature		Operating temperature	
Cable jacket material	**Low limit**	**High limit**	**Low limit**	**High limit**
PVC	–4 °F (–20 °C)	+194 °F (+90 °C)	–40 °F (–40 °C)	+221 °F (+105 °C)
Teflon FEP	–40 °F (–40 °C)	+194 °F (+90 °C)	–76 °F (–60 °C)	+302 °F (+150 °C)

Cable bend radii

The following tables show the cable bend radii of the different cables and the jacket materials:

- Table 4-5 shows the bend radii of jacketed cable.
- Table 4-6 shows the bend radii of shielded cable.
- Table 4-7 shows the bend radii of armored cable.

Table 4-5 Bend radii of jacketed cable

Jacket material	Outside diameter	Minimum bend radii	
		Static (no load) condition	Under dynamic load
PVC	0.415 inches (10 mm)	3–1/8 inches (80 mm)	6–1/4 inches (159 mm)
Teflon FEP	0.340 inches (9 mm)	2–5/8 inches (67 mm)	5–1/8 inches (131 mm)

Table 4-6 Bend radii of shielded cable

Jacket material	Outside diameter	Minimum bend radii	
		Static (no load) condition	Under dynamic load
PVC	0.2 inches (14 mm)	4–1/4 inches (108 mm)	8–1/2 inches (216 mm)
Teflon FEP	0.425 inches (11 mm)	3–1/4 inches (83 mm)	6–3/8 inches (162 mm)

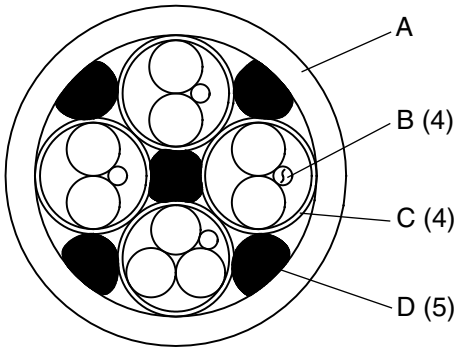
Table 4-7 Bend radii of armored cable

Jacket material	Outside diameter	Minimum bend radii	
		Static (no load) condition	Under dynamic load
PVC	0.525 inches (14 mm)	4–1/4 inches (108 mm)	8–1/2 inches (216 mm)
Teflon FEP	0.340 inches (9 mm)	3–1/4 inches (83 mm)	6–3/8 inches (162 mm)

Cable illustrations

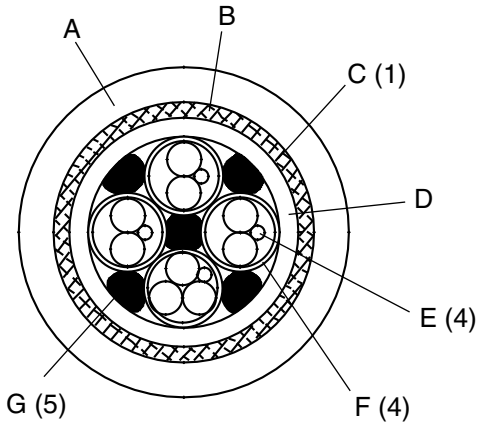
Figures 4-9 through 4-11 provide detailed cross-section views of the different cable types.

Figure 4-9 Cross-section view of jacketed cable



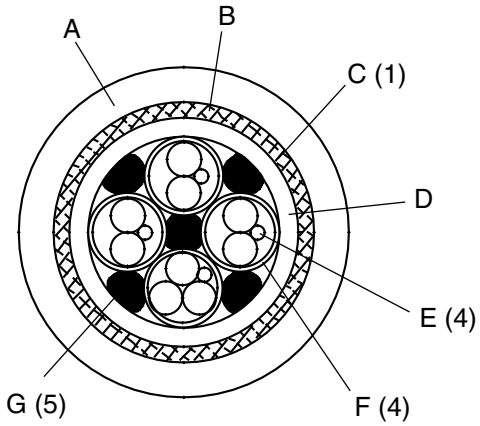
A Outer jacket
B Drain wire (4 total)
C Foil shield (4 total)
D Filler (5 total)

Figure 4-10 Cross-section view of shielded cable



A Outer jacket
B Tin-plated copper braided shield
C Foil shield (1 total)
D Inner jacket
E Drain wire (4 total)
F Foil shield (4 total)
G Filler (5 total)

Figure 4-11 Cross-section view of armored cable



A Outer jacket
B Stainless steel braided shield
C Foil shield (1 total)
D Inner jacket
E Drain wire (4 total)
F Foil shield (4 total)
G Filler (5 total)

Chapter 5

Wiring the outputs

Topics covered in this chapter:

- Analog output terminals
- Wire the primary and secondary mA outputs
- Wire the frequency/pulse output
- Wire the discrete output
- Wire the discrete input
- Wire to a pressure transmitter

Analog output terminals

Use the upper and lower terminal blocks on the right side of the partition on the 9739 MVD transmitter electronics module for analog output wiring connections. Use twisted-pair, shielded cable for all I/O connections. The partition on the transmitter electronics module keeps intrinsically safe wiring to the sensor separated from non-intrinsically safe analog output wiring. You can unplug the terminal block connectors from the electronics module for easier installation of wiring.

Figure 5-1 and Table 5-8 identify the analog output terminals and their functions for the 9739 MVD transmitter.

Analog output wiring is not intrinsically safe. Keep output wiring separated from power supply wiring and intrinsically safe sensor wiring. Failure to comply with requirements for intrinsic safety in a hazardous area could result in an explosion.

Important

The **Service port** clips on the user interface of the 9739 MVD transmitter are directly connected to RS-485 terminals (26 and 27). If you wire the transmitter for RS-485 digital communications, you cannot use the **Service port** clips for communication with the transmitter.

Figure 5-1 Analog output terminals

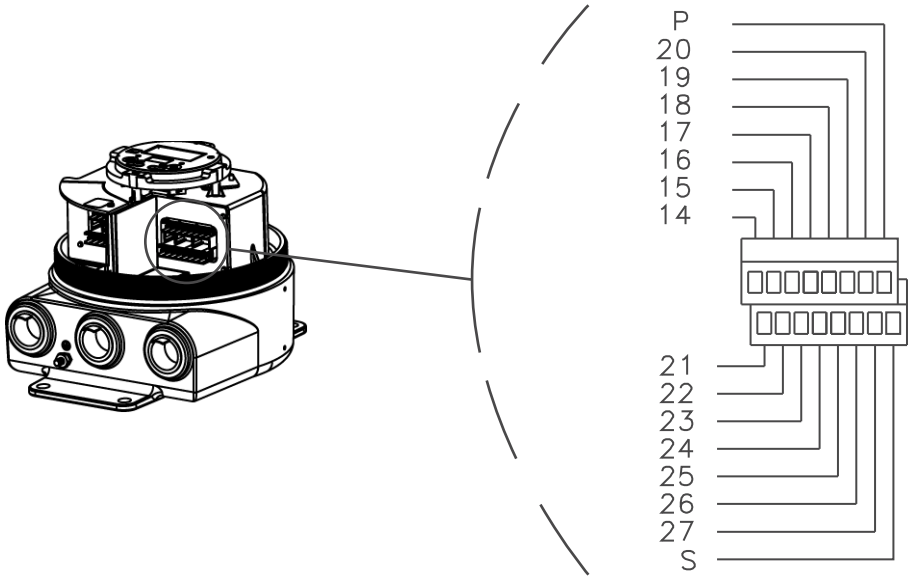


Table 5-8 Analog output wiring terminal designations

Terminal	Function
14	Frequency output, DC supply voltage (+)
15 and 16	Frequency/pulse output (+)
16	Return
17	Primary variable (PV+) mA output
18	Primary variable (PV–) mA output
19	Secondary variable (SV+) mA output
20	Secondary variable (SV–) mA output
21 and 16	Discrete input (Zero) (+)
22 and 16	Discrete output (Control output)
23	Signal ground
24 and 23	Temperature output (mV signal)
25 and 23	Tube period output
26	RS-485 I/O (A+): shared with **Service port A** on the user interface
27	RS-485 I/O (B–): shared with **Service port B** on the user interface
P	DC power to pressure or DP transmitter
S	mA input from pressure or DP transmitter

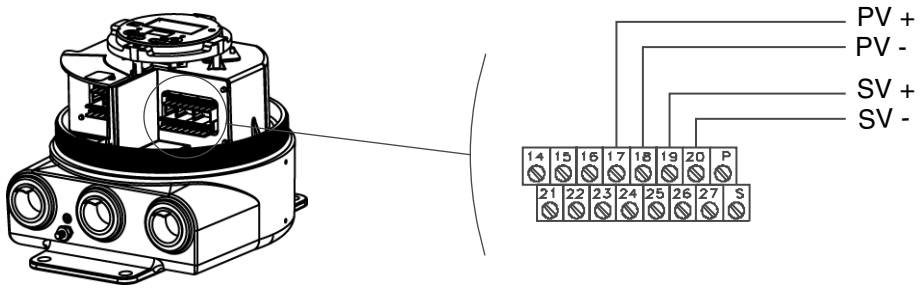
Wire the primary and secondary mA outputs

Use terminals **17** and **18** for the primary mA output. Use terminals **19** and **20** for the secondary mA output. The mA outputs produce a user-selected 0–20 mA or 4–20 mA current. When configured as 4–20 mA outputs, the mA outputs can supply loop-powered process indicators. The primary mA output can also be configured for HART®/Bell 202 communications.

Procedure

1. Determine the maximum allowable length for mA signal wiring by measuring the resistance over the signal wires and through the receiver device. Total loop resistance must not exceed 1000 Ω.
2. See Figure 5-2 for information on wiring the primary and secondary mA outputs. To wire the primary mA output for HART/Bell 202 communications, see Figure 5-3.

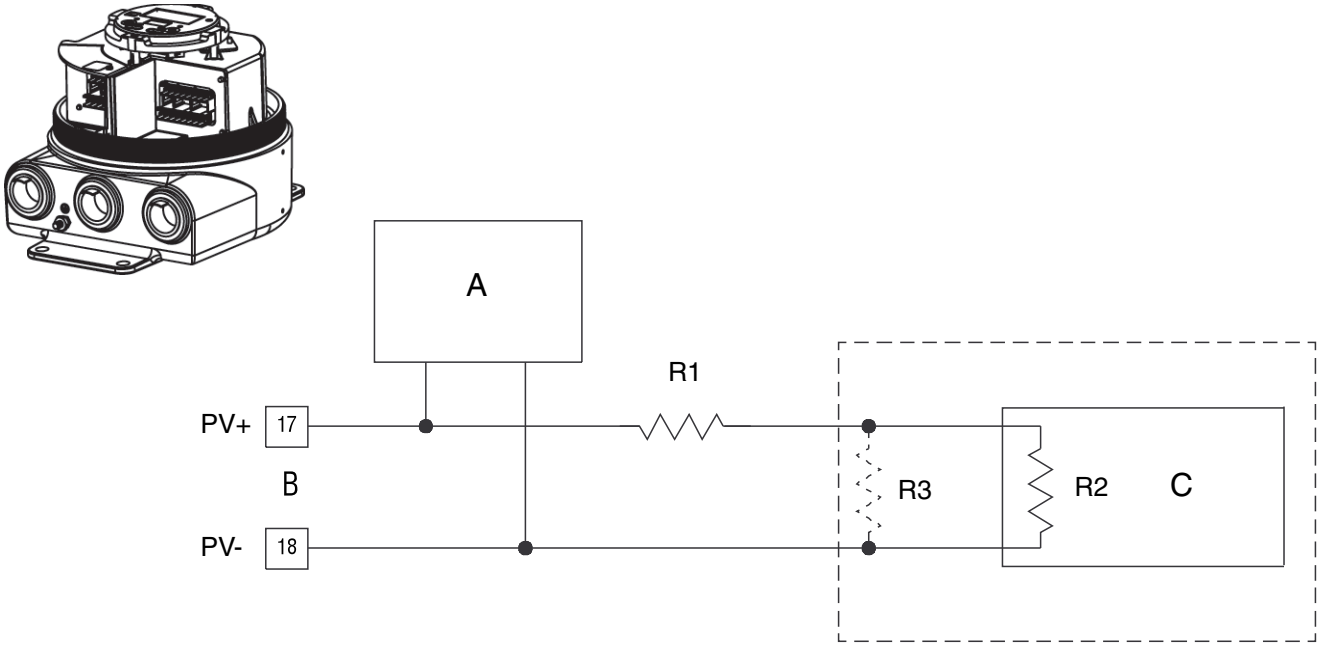
Figure 5-2 Wiring the primary and secondary mA outputs



Notes

- PV is the primary variable. PV+ is the signal line, and PV− is the return.
- SV is the secondary variable. SV+ is the signal line, and SV− is the return.

Figure 5-3 Wiring the primary mA output for HART communications



A HART communications tool, ProLink II, or AMS modem
B Communicator loops or PV (Primary Variable) terminals
C DCS or PLC with internal resistor

Notes

- If necessary, add resistance in the loop by installing a resistor R1. SMART FAMILY® devices require a minimum loop resistance of 250 Ω. Loop resistance must not exceed 1000 Ω, regardless of the communication setup.
- You must configure the DCS or PLC for an active milliamp signal.
- Resistor R3 is required if the DCS or PLC does not have an internal resistor.
- Ensure that mA output loops are grounded properly, either at the transmitter end or at the external device.

Wire the frequency/pulse output

As shipped, the frequency/pulse output of the 9739 MVD transmitter is internally powered by an isolated 15 V source via a 2.2 kΩ pull-up resistor. This internal current is limited to approximately 7 mA. You can wire the frequency/pulse output for increased current, constant current, or external power.

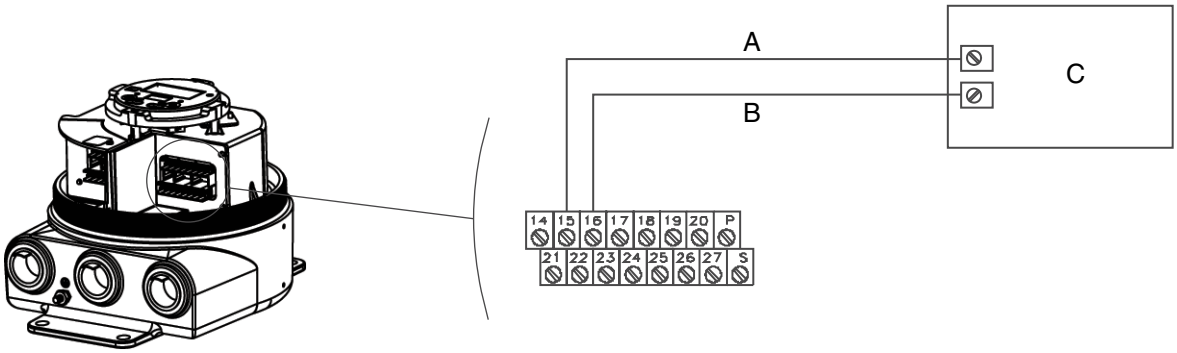
Procedure

Use terminals **15** and **16** for wiring the frequency/pulse output.

The frequency/pulse output, discrete output, and discrete input share terminal **16** as a common return.

- To wire the output for the standard or default configuration (using internal power), see Figure 5-4.

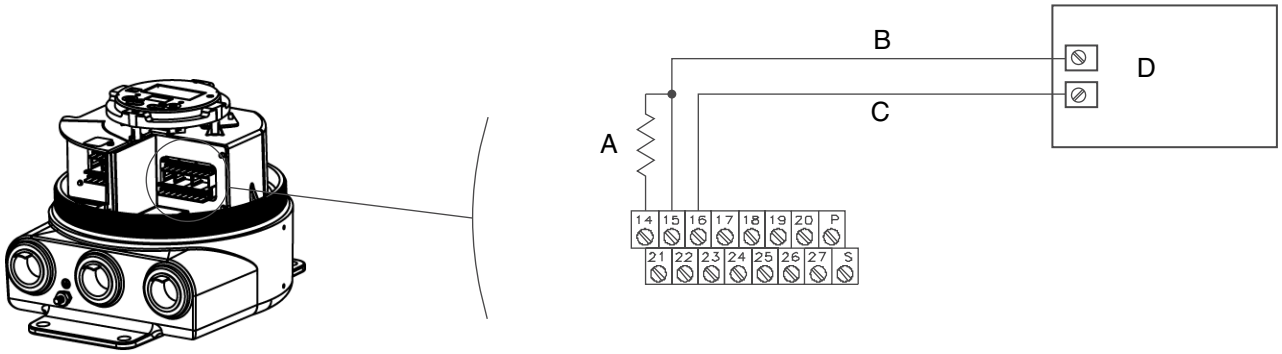
Figure 5-4 Wiring the frequency/pulse output



A FREQ+
B RETURN
C PLC or pulse counter

- To configure the output for increased current, add a 1 to 3 kΩ resistor across terminals **14** and **15** (see Figure 5-5).

Figure 5-5 Wiring the frequency/pulse output for increased current

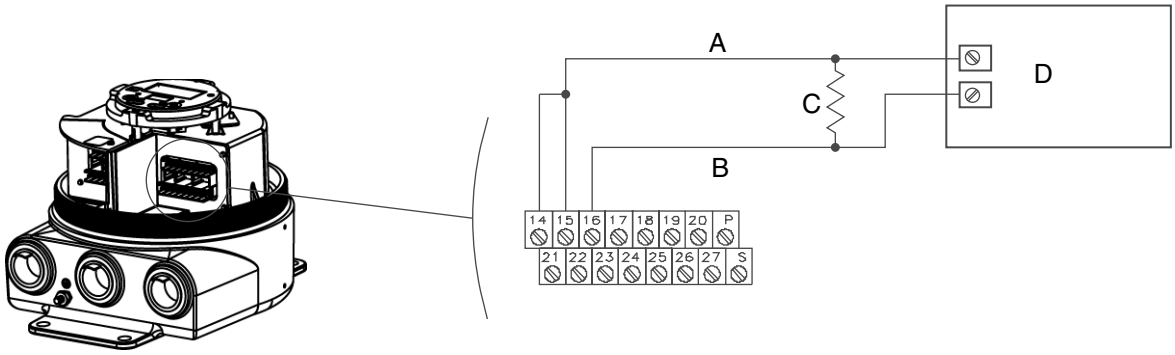


A 1 to 3 kΩ resistor
B FREQ+
C RETURN
D PLC or pulse counter

- To configure the output for constant current, add a jumper across terminals **14** and **15**, and a 100 to 250 Ω resistor at the PLC or pulse-counter end of the cable (see Figure 5-6).

If the frequency/pulse output is configured for constant current, the discrete output circuit is inoperable. To reconfigure the discrete output to function, you can configure the discrete output for operation using external power.

Figure 5-6 Wiring the frequency/pulse output for constant current

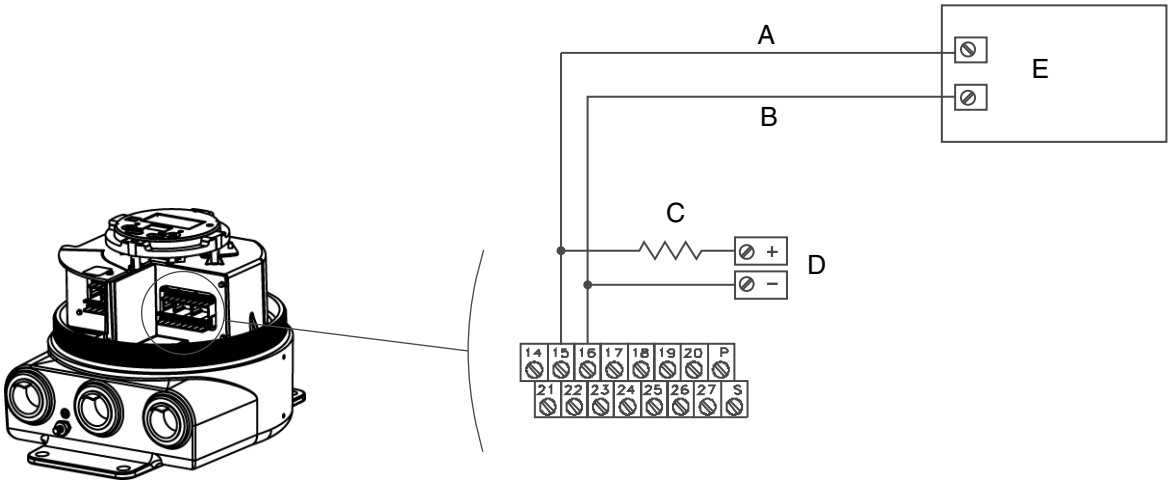


A FREQ+
B RETURN
C 100 to 250 Ω resistor
D PLC or pulse counter

- To wire the output to use external power, see Figure 5-7. For recommended resistor versus supply voltage, see Figure 5-8.

Do not exceed 30 VDC input. Excessive current will damage the transmitter. Terminal current must be less than 500 mA.

Figure 5-7 Wiring the frequency/pulse output for external power



A FREQ+

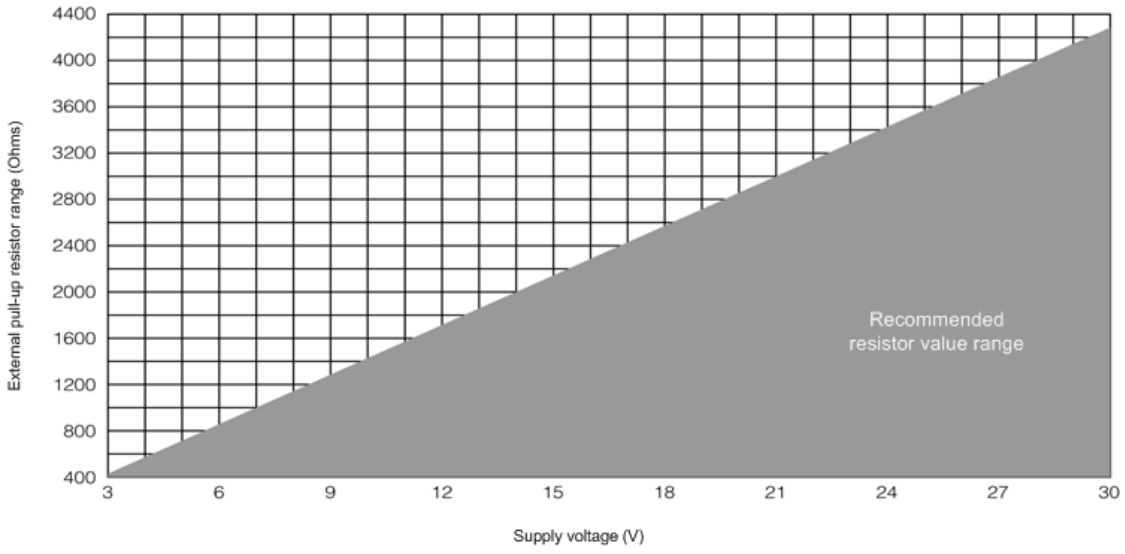
B RETURN

C A pull-up resistor, which must be of sufficient value to limit loop current to less than 500 mA depending on the total loop resistance at the transmitter

D 3 to 30 VDC power supply

E PLC or pulse counter

Figure 5-8 Recommended pull-up resistor versus supply voltage (external power)



Wire the discrete output

The discrete output can indicate the flow direction, transmitter zeroing in progress, pressure input failure, faults, event 1 or event 2. You can wire the discrete output to use internal or external power. See *Micro Motion 9739 MVD Transmitters: Configuration and Use Manual* for more information on configuring the discrete output for events.

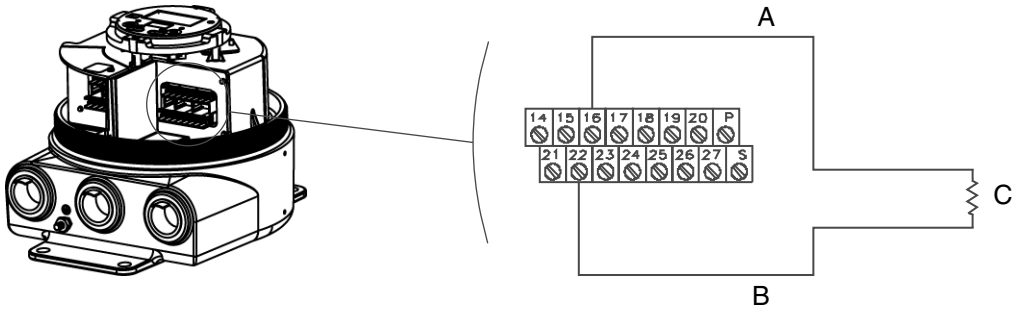
Procedure

Use terminals **22** and **16** for the discrete output.

The discrete output, frequency/pulse output, and discrete input share terminal **16** as a common return.

- If wiring the discrete output to be internally powered, see Figure 5-9.

Figure 5-9 Wiring for discrete output (default configuration)

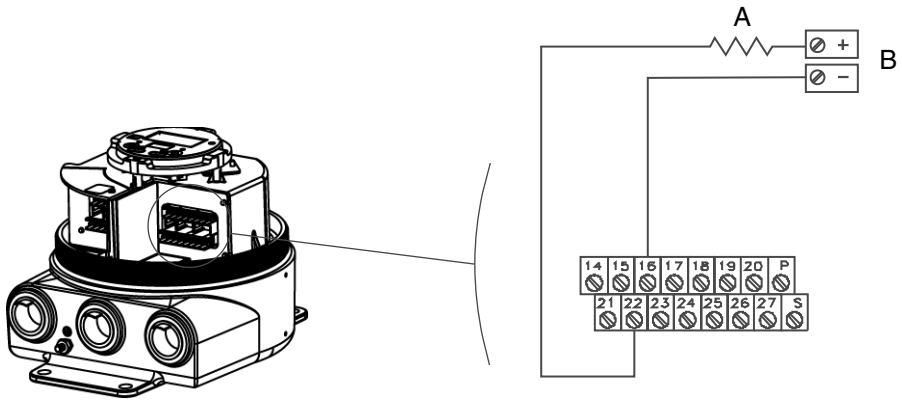


A RETURN (ground)
B CONTROL (signal line)
C Total load

- If wiring the discrete output to be externally powered, see Figure 5-10. For recommended resistor versus supply voltage, see Figure 5-11.

Do not exceed 30 VDC input. Excessive current will damage the transmitter. Terminal current must be less than 500 mA.

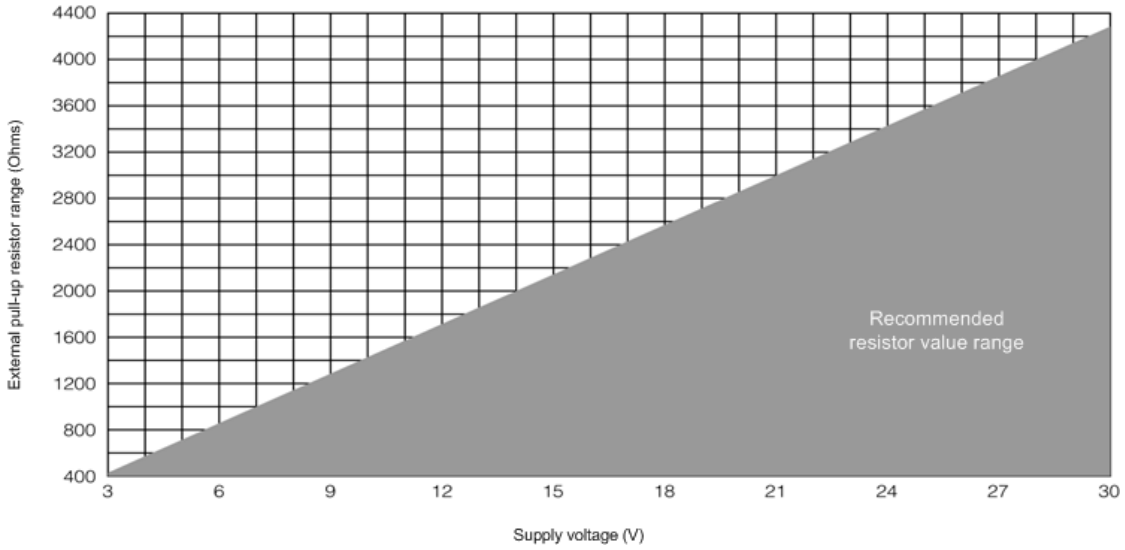
Figure 5-10 Wiring the discrete output for external power



A A pull-up resistor, which must be of sufficient value to limit loop current to less than 500 mA depending on total loop resistance at the transmitter

B 3 to 30 VDC power supply

Figure 5-11 Recommended pull-up resistor versus supply voltage (external power)



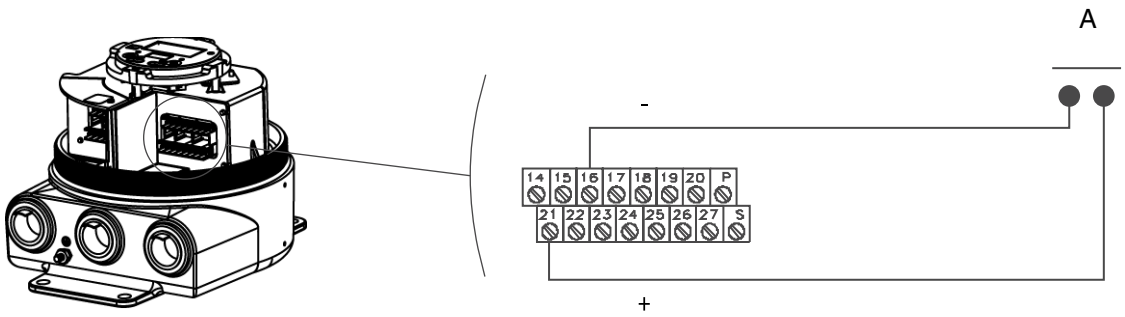
Wire the discrete input

Procedure

Use terminals **21** and **16** for the discrete input. See Figure 5-12 for wiring the discrete input.

The discrete input, frequency/pulse output, and discrete output share terminal **16** as a common return.

Figure 5-12 Wiring the discrete input



A Remote switch

Wire to a pressure transmitter

The 9739 MVD transmitter accepts inputs from a pressure transmitter for pressure compensation.

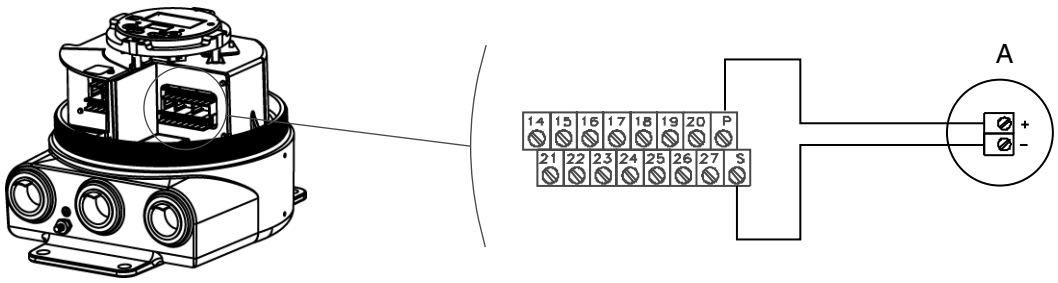
Because the pressure transmitter wiring is not intrinsically safe, keep the pressure transmitter wiring separated from the power supply wiring, intrinsically safe sensor wiring, and any other intrinsically safe wiring. Failure to comply with requirements for intrinsic safety in a hazardous area could result in an explosion.

Procedure

Choose from the following options:

- If the pressure transmitter requires a power supply less than or equal to 13.6 V, you can use the 9739 MVD transmitter to power the pressure transmitter. Use terminals **P** and **S** to connect to a pressure transmitter (see Figure 5-13). Do not connect these terminals to a control system.

Figure 5-13 Wiring to a pressure transmitter — internal power, analog input



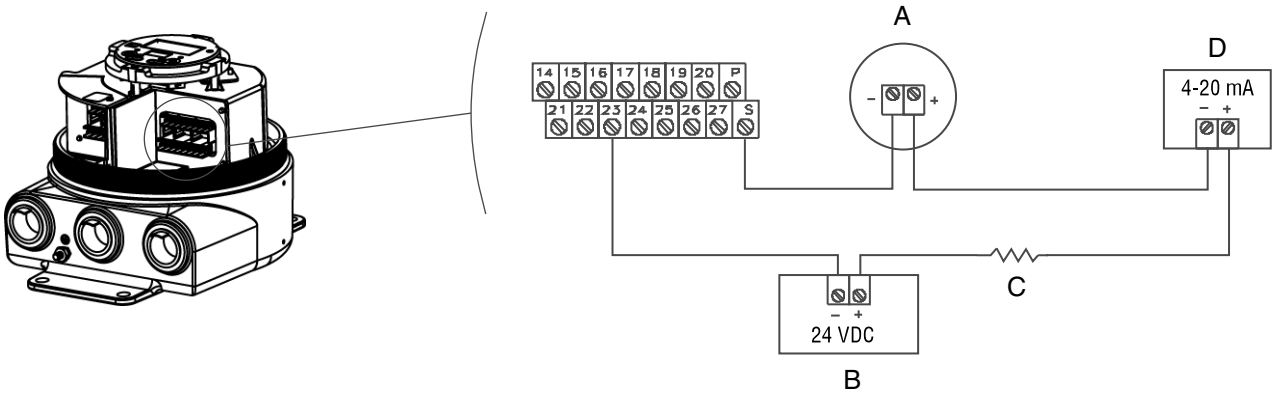
A Pressure transmitter

Notes

- Terminal **P (MA PWR OUT)** is the power output to the pressure transmitter.
- Terminal **S (MA SIG IN)** is the signal input to the 9739 MVD transmitter.

- If the pressure transmitter requires a power supply greater than 13.6 V, or if other loop devices are required, you can use an external source to power the pressure transmitter. Use terminals **S** and **23** (see Figure 5-14).

Figure 5-14 Wiring to a pressure transmitter — external power, analog input



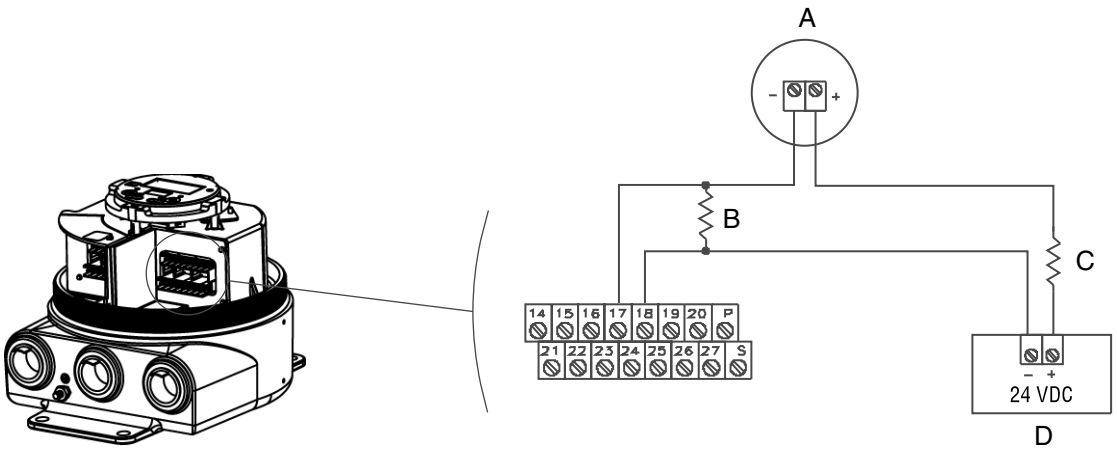
A Pressure transmitter
B DC power supply
C Current limiting resistor
D Optional loop device(s)

Notes

- Terminal **S (MA SIG IN)** is the signal input to the 9739 MVD transmitter.
- Terminal **23 (SIGNALGND)** is the return. You must connect terminal **23** directly to the negative (-) terminal of the external power supply.

- If digital communications between the pressure transmitter and the 9739 MVD transmitter is required, use terminals **17 (PV+)** and **18 (PV–)** (see Figure 5-15).

Figure 5-15 Wiring to a pressure transmitter — digital communications



A Pressure transmitter, with HART only
B 250 Ω ±5 %, 0.5 W
C 250 Ω ±5 %, 0.5 W
D DC power supply

Chapter 6

Wiring digital communications

Topics covered in this chapter:

- Wire the transmitter to an RS-485 multidrop network
- Wire the transmitter to a Bell 202 multidrop network

Wire the transmitter to an RS-485 multidrop network

Prerequisites

Use twisted-pair, shielded cable that consists of 24 AWG (0.25 mm^2) or larger wire between the 9739 MVD transmitter and the RS-485 communication device. Maximum cable length is 4000 ft (1200 m).

Note
For long-distance communication, or if noise from an external source interferes with the signal, install a 120-Ω, 1/2-W resistor at both ends of the network cable to reduce electrical reflections.

Procedure

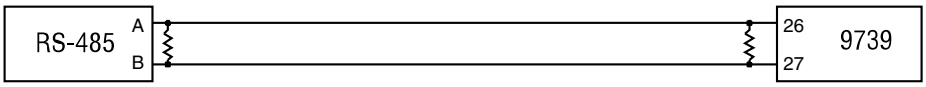
Use terminals **27** and **26** to wire the 9739 MVD transmitter to an RS-485 network.

Important
The **Service port** clips on the user interface of the 9739 MVD transmitter are directly connected to RS-485 terminals (26 and 27). If you wire the transmitter for RS-485 digital communications, you cannot use the **Service port** clips for communication with the transmitter.

Choose from the following options for wiring the RS-485 network:

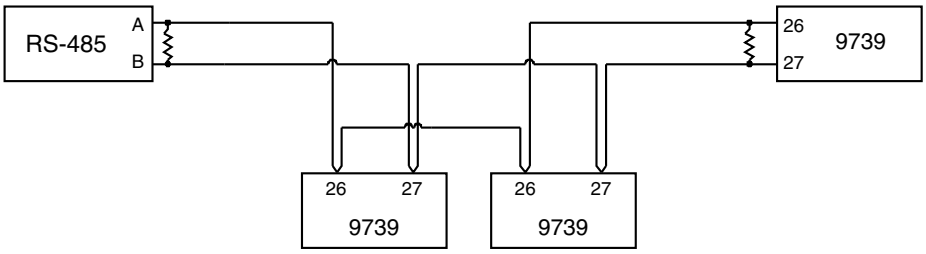
- To connect one transmitter to a host controller for the RS-485 serial communication, see Figure 6-1.

Figure 6-1 Wiring a 9739 MVD transmitter to a host controller



- To connect multiple transmitters to a host controller for the RS-485 serial communication, see Figure 6-2.

Figure 6-2 Wiring multiple 9739 MVD transmitters to a host controller

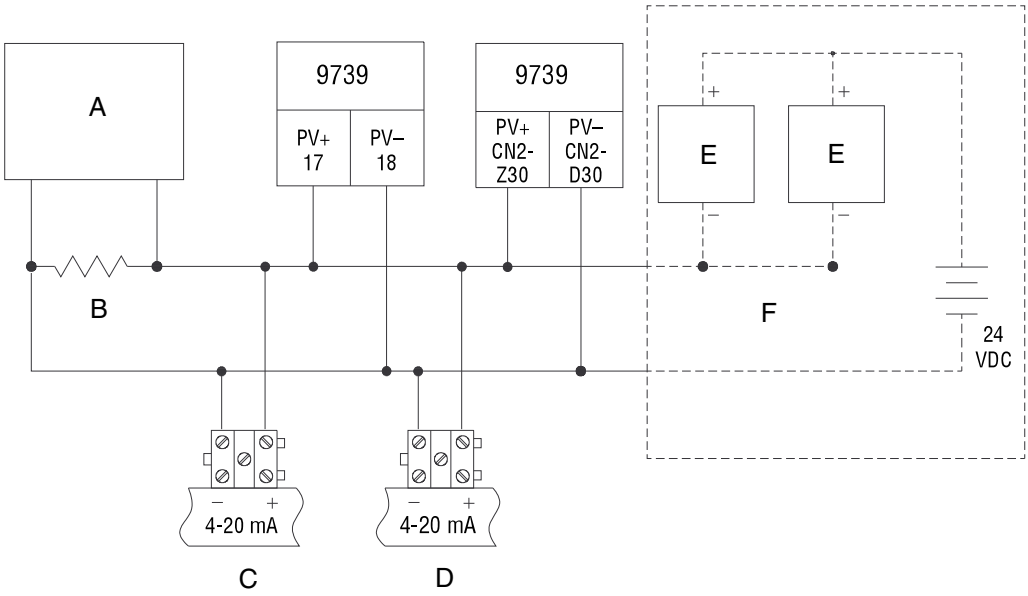


Wire the transmitter to a Bell 202 multidrop network

Procedure

Use terminals **17** and **18** to wire the 9739 MVD transmitter to a Bell 202 network (see Figure 6-3).

Figure 6-3 Wiring to a typical HART® network



A HART communications tool, ProLink II, or AMS modem

B 250 Ω load

C IFT9701

D R-Series

E SMART FAMILY® transmitter

F DC source required for other HART 4–20 mA passive transmitters

Notes

- SMART FAMILY devices require a minimum loop resistance of 250 Ω. Loop resistance must not exceed 1000 Ω.
- Connect the mA output from each9739 MVD transmitter together so they terminate at a common load resistor, with at least 250 Ω impedance, installed in series.
- For optimum HART communication, make sure the output loop is single-point grounded to instrument grade ground.

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Micro Motion Inc. USA

Worldwide Headquarters

7070 Winchester Circle
Boulder, Colorado 80301
T +1 303–527–5200
+1 800–522–6277
F +1 303–530–8459

Micro Motion Europe

Emerson Process Management

Neonstraat 1
6718 WX Ede
The Netherlands
T +31 (0) 318 495 555
F +31 (0) 318 495 556

Micro Motion United Kingdom

Emerson Process Management Limited

Horsfield Way
Bredbury Industrial Estate
Stockport SK6 2SU U.K.
T +44 0870 240 1978
F +44 0800 966 181

Micro Motion Asia

Emerson Process Management

1 Pandan Crescent
Singapore 128461
Republic of Singapore
T +65 6777–8211
F +65 6770–8003

Micro Motion Japan

Emerson Process Management

1–2–5, Higashi Shinagawa
Shinagawa-ku
Tokyo 140–0002 Japan
T +81 3 5769–6803
F +81 3 5769–6843

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